



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,395	03/28/2005	Terutake Hayashi	052310	6731

38834 7590 05/16/2007  
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER
----------

PRITCHETT, JOSHUA L

ART UNIT	PAPER NUMBER
----------	--------------

2872

MAIL DATE	DELIVERY MODE
-----------	---------------

05/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/529,395	<b>Applicant(s)</b> HAYASHI ET AL.	
	<b>Examiner</b> Joshua L. Pritchett	<b>Art Unit</b> 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

This action is in response to Amendment filed February 26, 2007. Claims 1-3 and 6-28 have been amended as requested by the applicant.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6, 27 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishihara (JP 10-318733). NOTE A computer translation was used for the textual citations and a copy of the computer translation accompanies this action.

Regarding claims 1 and 3, Ishihara discloses an inlet optical part to let a polarized light from a polarized light from an illumination light source (1) and a straight polarizer (204) onto an object (A) to be observed via a beam splitter (5), a matrix type liquid crystal device (20) provided with a microlens array (7) on its top part, and an objective lens (8; Fig. 1); a light detecting part (15) including an imaging device to detect a reflected or a fluorescent light from the object to be observed via a beam splitter and lens (Fig. 1); and a control part including a liquid crystal control subpart to control each pixel of the matrix type liquid crystal device (para.

Art Unit: 2872

0016-0018); the microlens array being made up of a plurality of microlenses aligned in an array at positions corresponding to each pixel of the matrix type crystal device (Fig. 3); characterized in that it transmits the light passing through the microlens array from each microlens to each pixel of the matrix type liquid crystal device aligned in the position corresponding to the each microlens, and makes a plurality of foci on the object to be observed by the objective lens as well as controls the polarization direction of the light transmitted through each neighboring pixel of the matrix type liquid crystal device using the liquid crystal control subpart (para. 0016; Fig. 1) and the liquid crystal control subpart controls polarization of the lights transmitted through each neighboring pixel of the matrix type liquid crystal device so that they are made mutually orthogonal and makes a plurality of foci with the lights the polarization directions of which are mutually orthogonal onto an object to be observed (para. 0016-0018; Fig. 1). The liquid crystal device (20) would serve as a second liquid crystal device when the light travels back from the sample and back through the liquid crystal device on the way to the detector (Fig. 1).

Regarding claims 2 and 6, Ishihara discloses a polarizer (204) is located in the lower part of the matrix type liquid crystal device (Fig. 2a) and a polarized light transmitted through the polarizer is controlled by each pixel of the matrix type liquid crystal (para. 0016-0018).

Regarding claim 27, Ishihara teaches a method of measuring polarized light from the objective to be observed using a confocal microscope (Fig. 1).

Regarding claim 28, Ishihara teaches the polarized light from the object is rotated by the polarized light by 180-degrees (para. 0017-0019).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-18, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara (JP 10-318733) in view of Hoffman (US 2001/0042837).

Regarding claims 7-18, Ishihara teaches an inlet optical part to let a polarized light from a polarized light from an illumination light source (1) and a straight polarizer (204) onto an object (A) to be observed via a beam splitter (5), a matrix type liquid crystal device (20) provided with a microlens array (7) on its top part, and an objective lens (8; Fig. 1); a light detecting part (15) including an imaging device to detect a reflected or a fluorescent light from the object to be observed via a beam splitter and lens (Fig. 1); and a control part including a liquid crystal control subpart to control each pixel of the matrix type liquid crystal device (para. 0016-0018); the microlens array being made up of a plurality of microlenses aligned in an array at positions corresponding to each pixel of the matrix type crystal device (Fig. 3); characterized in that it transmits the light passing through the microlens array from each microlens to each pixel of the matrix type liquid crystal device aligned in the position corresponding to the each microlens, and makes a plurality of foci on the object to be observed by the objective lens as well as controls the

polarization direction of the light transmitted through each neighboring pixel of the matrix type liquid crystal device using the liquid crystal control subpart (para. 0016; Fig. 1) and the liquid crystal control subpart controls polarization of the lights transmitted through each neighboring pixel of the matrix type liquid crystal device so that they are made mutually orthogonal and makes a plurality of foci with the lights the polarization directions of which are mutually orthogonal onto an object to be observed (para. 0016-0018; Fig. 1). Ishihara lacks reference to the amplitude modulation. Hoffman teaches the use of a control for a liquid crystal device that controls amplitude modulation (para. 0021, 0038). Hoffman teaches the illumination device is either single or multiwavelength and the amplitude is modulated by using a matrix type liquid crystal device (para. 0018). Hoffman further teaches the amplitude modulation is applied to each pixel by a plurality of modulation frequency (para. 0018). Hoffman teaches the amplitude modulated polarized light being modulated by a frequency or a plurality of different frequencies (para. 0019). Hoffman teaches the use of Fourier information in the amplitude modulation (para. 0014). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the microscope of Ishihara have the amplitude control of Hoffman for the purpose of controlling the intensity of the light incident to the sample to prevent from damaging the sample.

Regarding claims 8 and 15, Ishihara teaches a polarizer (204) is located in the lower part of the matrix type liquid crystal device (Fig. 2a) and a polarized light transmitted through the polarizer is controlled by each pixel of the matrix type liquid crystal (para. 0016-0018).

Regarding claim 22, Ishihara teaches a method of measuring polarized light from the objective to be observed using a confocal microscope (Fig. 1).

Art Unit: 2872

Regarding claim 23, Ishihara teaches the polarized light from the object is rotated by the polarized light by 180-degrees (para. 0017-0019).

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara (JP 10-318733) in view of Hoffman (US 2001/0042837) as applied to claims 7 and 12 above, and further in view of Oshida (JP 2001-108684).

Ishihara in combination with Hoffman teaches the invention as claimed but lacks reference to the fluorescent marker or DNA material. Oshida teaches the use of fluorescent microscopy using a marker material where the substrate contains a DNA chip (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Ishihara in combination with Hoffman invention include the DNA material of Oshida for the purpose of determining the presence of a nucleotide on a strand of DNA or searching for a genetic marker.

Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara (JP 10-318733) in view of Oshida (JP 2001-108684).

Ishihara teaches the invention as claimed but lacks reference to the fluorescent marker or DNA material. Oshida teaches the use of fluorescent microscopy using a marker material where the substrate contains a DNA chip (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Ishihara invention include the DNA material of Oshida for the purpose of determining the presence of a nucleotide on a strand of DNA or searching for a genetic marker.

***Response to Arguments***

Applicant's arguments filed February 26, 2007 have been fully considered but they are not persuasive.

Applicant argues the liquid crystal cell of Ishihara is such that transparent electrode patterns and pinholes are alternately aligned, thus the liquid crystal cell of Ishihara is different from the liquid crystal device of the present invention in that the liquid crystal device of the present invention controls all pixels. There is nothing in the Ishihara reference that would lead the examiner to believe only a portion of the liquid crystal cells in Ishihara are controllable. Therefore, the examiner interprets the Ishihara liquid crystal cells to be the same as the current invention.

Applicant argues the light transmitted through the liquid crystal cell of Ishihara passes through the quarter phase difference plate and becomes circular polarized light to illuminate the sample. There are no limitations in the claim about what happens to the light after passing through the liquid crystal cells. Therefore this argument is moot.

Applicant argues Ishihara does not teach a plurality of foci mutually orthogonal polarized directions to be observed. Ishihara state the polarization of light injected from the adjacent pinhole cross at mutual right angles (para. 0018).

Applicant argues Ishihara does not teach a second microlens array: The claim language does not require the first and second microlens array or liquid crystal device be different. Therefore, the examiner's interpretation that the same microlens array and liquid crystal device



Art Unit: 2872

can perform as both first (forward direction) and second (return direction) microlens arrays and liquid crystal devices is valid within the claim language.

Applicant argues the present invention uses only a single light source and Hoffman uses two light sources. Nothing in the claim language requires only a single light source. The claims use the open ended phrase "comprising" therefore multiple light sources are not precluded from a claim that comprises a light source.

Applicant's arguments, see Amendment, filed February 26, 2007, with respect to objection of the abstract have been fully considered and are persuasive. The objection of the abstract has been withdrawn. Applicant amended the abstract to conform to MPEP requirements.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

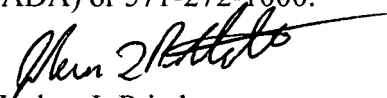
Art Unit: 2872

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L. Pritchett whose telephone number is 571-272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Joshua L Pritchett  
Examiner  
Art Unit 2872